AMENDMENT NO. 1 AUGUST 2023

TO

IS 12084 : 2018 MORPHOLINE — SPECIFICATION

(First Revision)

(*Foreword*, *para* 2, *line* 2) — Delete.

(*Page* 1, *clause* **1**) — Substitute the following for the existing:

'This standard prescribes the requirements and methods of sampling and test for morpholine.'

(*Page* 1, *Table* 1) — Substitute the following for the existing Table 1:

Sl No.	Characteristic	Requirements	Method of Test, Ref to	
			Annex	IS No.
(1)	(2)	(3)	(4)	(5)
i)	Purity (as morpholine), percent by mass, *Min*	99.0	B	—
ii)	Relative density, 20/20 °C, *Min*	1.001	C	—
iii)	(Pt-Co) colour scale , *Max*	15	—	3025 (Part 4)
iv)	Boiling range	125 °C to 129 °C for 90 percent recovery	—	5298
v)	Residue, on evaporation, mg/l, *Max*	1 000	D	—
vi)	Ash content, g/100 ml, *Max*	0.003	E	—
vii)	Iron (as Fe), ppm, *Max*	5	F	3025 (Part 53) or 3025 (Part 2)[1)] or 3025 (Part 65)[1)]
viii)	Copper (as Cu), ppm, *Max*	5	F	3025 (Part 42) or 3025 (Part 2)[1)] or 3025 (Part 65)[1)]
ix)	Nickel (as Ni), ppm, *Max*	5	F	3025 (Part 54) or 3025 (Part 2)[1)] or 3025 (Part 65)[1)]
x)	Silica (as SiO_2), ppm, *Max*	5	—	3025 (Part 35) or 3025 (Part 2)[2)] or 3025 (Part 65)[2)]
xi)	Chloride (as Cl), ppm, *Max*	5	—	3025 (Part 32)

[1)] In case of determination of Cu, Fe, and Ni in morpholine by IS 3025 (Part 2) or IS 3025 (Part 65), it is recommended that the sample preparation as prescribed in **F-1** of Annex F may be followed.

[2)] In case of determination of Silica (as SiO_2) in morpholine by IS 3025 (Part 2) or IS 3025 (Part 65), it is recommended that the sample preparation as prescribed in **F-2** of Annex F may be followed.

Price Group 2

(*Page* 3, *Annex* A) — Insert the following after IS 2263 : 1979:

IS No.	*Title*
IS 3025 (Part 2) : 2019/ISO 11885 : 2007	Methods of sampling and test (physical and chemical) for water and wastewater: Part 2 Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP - OES) (*first revision*)
IS 3025 (Part 65) : 2022/ISO 17294-2 : 2016	Methods of sampling and test (physical and chemical) for water and wastewater: Part 65 Application of inductively coupled plasma mass spectrometry (ICP - MS) — Determination of selected elements including uranium isotopes (*first revision*)

(*Page* 5, *Annex* E) — Insert the following Annex after Annex E:

‘**ANNEX F**

[*Table* 1, *Sl No*. (vii), (viii), (ix), *and* (x)]

SAMPLE PREPARATION FOR DETRMINATION OF COPPER, IRON, NICKLE, AND SILICA IN MORPHOLINE BY ICP-OES OR ICP-MS METHOD

F-1 SAMPLE PREPARATION METHOD FOR DETERMINATION OF COPPER, IRON AND NICKLE IN MORPHOLINE USING ICP OES OR ICP-MS

F-1.1 Automated Digestion System

F-1.1.1 *Analytes* — Cu, Fe, Ni

F-1.1.2 *Reagents*

F-1.1.2.1 *De-ionized water*

F-1.1.2.2 *Sulphuric acid* (H_2SO_4), 96 percent (m/m)

F-1.1.2.3 *Perchloric acid* ($HClO_4$), 70 percent (m/m)

F-1.1.2.4 *Nitric acid* (HNO_3), 65 percent (m/m)

F-1.1.2.5 *Hydrochloric acid* (HCl), 36 perecent (m/m)

F-1.1.2.6 *Cesium sulphate* (Cs_2SO_4), 99.9 percent (m/m)

F-1.1.2.7 *Mixed acid*

Mix concentrated nitric acid, concentrated sulphuric acid and concentrated perchloric acid at a volume ratio of 2 : 1 : 1.

F-1.1.2.8 *Acid mixture* 1

Mix sulfuric acid and nitric acid at a volume ratio of 39 : 1. Add 2.2 g/l Cs_2SO_4 to it.

F-1.1.2.9 *Hydrochloric acid,* 5 percent (v/v)

Mix hydrochloric acid 36 percent (m/m) and de-ionized water in a volume ratio of 1 : 19.

F-1.3 Sample Preparation

Weigh 0.35 g to 0.40 g of sample and add it into the automated acid digestion system. In digestion system, add acid mixture-I and crack the sample at 320 °C approximately. Digest completely the organic remnants with mixed acid at 160 °C. Evaporate the excess acids to dryness. Add 5 percent (v/v) hydrochloric acid to the residue, heat until boiling. Perform the analysis on duplicate. Run a blank in an analogous manner.

F-2 SAMPLE PREPARATION METHOD FOR DETERMINATION OF SILICA IN MORPHOLINE USING ICP OES OR ICP-MS

F-2.1 Reagents

F-2.1.1 *Hydrochloric Acid* (HCl), 50 volume percent, 6 ml

F-2.1.2 *Potassium Carbonate-Sodium Carbonate* (K_2CO_3-Na_2CO_3), 0.4 g

F-2.1.3 *Borax* ($Na_2B_4O_7$), 0.1 g

F-2.2 Apparatus

F-2.2.1 *Dessicator*

F-2.2.2 *Muffle Furnace*, calibrated to 550 °C

F-2.2.3 *Platinum Dish*

F-2.2.4 *Balance*, capable of weighing the density bottle to the nearest 0.1 mg

F-2.2.5 *Open Flame* (*Bunsen Burner*)

F-2.3 Sample Preparation

F-2.3.1 Pre-condition the Pt dish in muffle furnace at 550 °C for 10 min. Cool it down to room temperature in dessicator prior to use. Measure the tare weight of the Pt dish.

Take 100 g to 115 g of sample in small portions of 20 g to 40 g into the Pt dish and burn above the open flame (Bunsen burner) in subsequent steps prior to total incineration. Incinerate the overall sample residue in a muffle furnace at 550 °C for 30 min. Transfer the dish to a dessicator and cool down the residue to room temperature. Carry out the same procedure on duplicate.

F-2.3.2 After incineration, the residue is homogenized with a mixture of K_2CO_3-Na_2CO_3 and $Na_2B_4O_7$ [soda : borax, 4 : 1 (w/w)] and subsequently melt above an open flame. At the end of the procedure a clear melt is obtained. Dissolve the cooled melt cake in 6 ml of hydrochloric acid and 10 ml of water and heat it. Add water to make up volume of 50 ml.

F-2.3.3 Carry out the digestion and determination on duplicate. The reported value is the mean value of the double determination.'

(CHD 13)

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